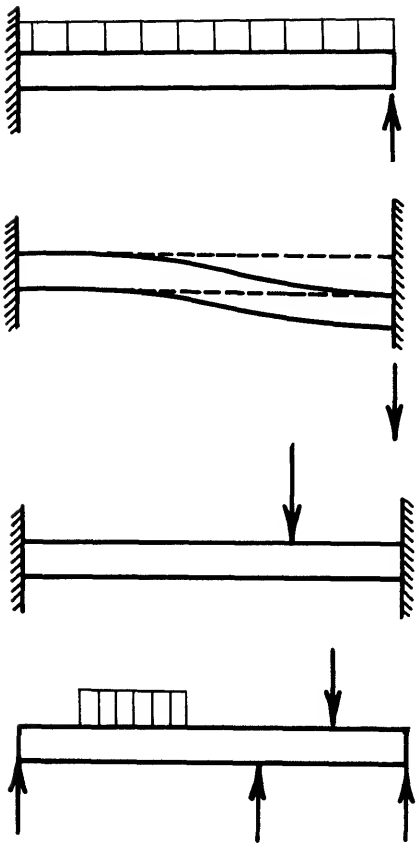

Fig. 23.1 Examples of beams with constraint.

say, is lowered to a different level through a distance Y, it may be observed that the beam behaves, in effect, as a double cantilever. Cutting the beam in half, we obtain the equilibrium such as that shown in Fig. 23.2. Each of the two cantilevers is then subjected to free deflection at the end equal to

$$\frac{Y}{2} = \frac{W}{3EI}\left(\frac{L}{2}\right)^3$$

which gives

$$Y = \frac{WL^3}{12EI} \tag{23.1}$$

The end-fixing moment is

$$M_0 = \frac{WL}{2} \tag{23.2}$$